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# THE PLANT DISEASE REPORTER

Issued By

## THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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Data indicating considerable variation in susceptibility of varieties and strains of annual lespedezas to powdery mildew are reported by J. L. Weimer and Julius M. Elrod, page 13.

Mathias C. Richards and Raymond W. Barratt, page 16, report that in tests with 137 species and varieties of the genus Lycopersicon, none showed high resistance to or immunity from attack by Phytophthora infestans.

An epiphytotic of Rhizopus soft rot of green-wrap tomatoes in California in 1944 was due primarily to use of unsterilized, badly infested picking boxes and liners from the preceding season, according to Kenneth F. Baker, page 20.

C. C. Wernham, page 26, records three corn diseases not previously reported from Pennsylvania.

P. A. Ark and C. M. Tompkins report incidence of a number of bacterial diseases in California in 1945, page 28.

Potato late blight is among the diseases reported by G. R. Townsend, R. C. Cassell, and E. L. Felix in their November report of vegetable diseases in Palm Beach County, Florida, page 29.

In Brief Notes, page 30, J. R. Kienholz reports correlation between Phytophthora rot of pears and sprinkler irrigation in Oregon; R. C. Rose reports occurrence and control of blackleg on rutabaga in Minnesota; W. D. Valleau reports powdery mildew on tobacco in Kentucky; P. A. Ark and C. M. Tompkins report a bacterial soft rot of leaves and flowers of yellow calla in California; and J. A. Denning reports that oak wilt has been observed on some new hosts and in additional locations in Missouri.

December weather, page 33.

## CHECK LIST REVISION

Freeman Weiss

DESMANTHUS (LEGUMINOSAE)

DESMANTHUS ILLINOENSIS (Michx.) Mac M., BUNDLEFLOWER (1). Perennial herb of moist open ground ranging from Ohio to Fla., Tex. and S. Dak.; of food value to wildlife and is sometimes planted for ornament in wild gardens. D. COOLEYI (Eaton) Trel. (D. JAMESII Torr. & A. Gray) (2) is similar, on dry plains.

Cercospora desmanthi Ell. & Kell., leaf spot. Kans., La., Mo., N.Mex., S.Dak., Tenn. (1). This has been called Camptomeris desmanthi (Ell. & Kell.) Petr., and Cercosporidium desmanthi (Ell. & Kell.) Earle ex Dearn.

Erysiphe polygoni DC., powdery mildew. Ill., Miss., (1)

Ravenelia texensis Ell. & Gall. (II,III), rust. Tex. (2) O and I unknown.

DESMODIUM (LEGUMINOSAE)

DESMODIUM spp., TICK-TREFOIL. Mostly perennial herbs of dry woods and fields in the Eastern and Central States to Fla. and Tex. Several spp. of ornamental value, as D. canadense (L.) DC., may be grown in wild gardens; most are of food value to wildlife, and some are grown as cover crops and for forage (D. tortuosum DC.) in the far South.

Cephaleuros virescens O. Kunze, green scurf. P.R.

Cercospora desmodii Ell. & Kell., leaf spot. On D. grandiflorum (Walt.) DC. in Ill., Kans., Mich., N.Y. and Wis.; on D. molle DC., in Ala.; on D. nudiflorum (L.) DC. in Mo. and Wis.; on D. rotundifolium (Michx.) DC. in Va.

C. desmodiicola Atk., leaf spot. On D. canescens (L.) DC., Okla.; on D. rotundifolium, Ind. Perhaps identical with the following.

C. melaleuca Ell. & Ev., on stems of D. tortuosum in Fla.

Cladosporium infuscans Thuem., on living leaves of D. strictum (Pursh) DC. in S.Car.

Colletotrichum uncinatum (Berk. & Curt.) Duke, on stems of D. nudiflorum, ? N.Car.

Diaporthe arctii (Lasch) Nits., on stems of spp. N.J., N.Y.

Erysiphe polygoni DC., powdery mildew. On D. canescens, Ohio.

Heterodera marioni (Cornu) Goodey, root knot. On D. molle and D. strictum (very resistant), ? Fla.; on D. triflorum DC., Hawaii.

Meliola bicornis Wint., black mildew. On various spp. in P.R. and Canal Zone.

Microsphaera alni DC. ex Wint. var. ludens Salmon, powdery mildew. On D. canadense, Wis.

M. diffusa Cke. & Pk., powdery mildew. On numerous spp. throughout

DESMODIUM spp. cont.

the range; also in tropical America.

Mycosphaerella sp. (Sphaerella desmodii Wint.), on D. canescens, Mo.

Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. On various spp., from Me. to Fla., Miss. and N.Dak.; P.R. The collections on Desmodium have also been referred to P. paraguayensis Speg., questionably distinct.

Phakopsora meibomiae Arth. (II,III), rust. On D. incanum DC., P.R. O and I unknown.

Phyllachora simillima (Berk. & Rav.) Sacc., tar spot. On D. lineatum (Michx.) DC., S.Car.

P. stevensii Syd., tar spot. Canal Zone.

Phyllosticta desmodii Ell. & Ev., leaf spot. On D. canadense, Wis. and Ill.; D. illinoense, Wis.; D. rotundifolium, Ind.

P. macroguttata Earle, leaf spot. On D. dillenii Darl., Ala.

P. meibomiae Seaver, leaf spot. On D. dillenii, Ill.; D. rhombifolium DC., Fla.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (spp.)

Pseudomonas syringae van Hall, bacterial spot. On D. canescens, Ind.

Puccinia andropogonis Schw. var. onobrychidis (Burr.) Arth. (O,I), rust. On D. dillenii, Ala.; on D. grandiflorum, Minn. and Wis. II and II on Andropogon spp.

Ramularia desmodii Cke., leaf spot. On D. bracteosum (Michx.) DC., Kans.; D. canadense in Ill., Iowa, Kans., Miss., Nebr., and Wis.; D. canescens, Nebr.; D. dillenii, Ala.; D. illinoense A. Gray, Kans. and Wis.; D. lineatum (Michx.) DC., La., Miss. and S.Car.; D. obtusum (Muhl.) DC., S.Car.; D. paniculatum, Wis.

Sclerotium desmodii Thuem., on leaves of D. rotundifolium, S.Car.

S. rolfsii Sacc., root and stem rot. On D. molle and D. tortuosum, Fla.

Stagonospora desmodii Ell. & Ev., on stems of D. tortuosum, Fla.

Synchytrium aecidioides (Pk.) Lagh., leaf gall. On D. canescens, Miss.

Thecaphora deformans Dur. & Mont., seed smut. On D. grandiflorum, N.J.; D. nudiflorum, Md., Pa. and Va.

Uromyces hedysari-paniculati (Schw.) Farl. (O,I,II,III), rust. On numerous spp. from N.Y. to Fla., Tex. and Minn., also in tropical America. Aecial stage very rare.

DOLICHOS (LEGUMINOSAE)

DOLICHOS BIFLORUS L., TWINFLOWER DOLICHOS (1) and D. LABLAB L., HYACINTH-BEAN (2). Herbaceous vines of Old World tropics, grown for edible seeds and for ornament in the far south and tropical America.

Cercospora canescens Ell. & Ev. ( ? C. cruenta Sacc.), leaf spot. Fla., P.R. (2)

Erysiphe polygoni DC., powdery mildew. P.R. (1)

DOLICHOS cont.

Heterodera marioni (Cornu) Goodey, root knot. ? Fla. (1,2); S. Car. (2)

Microsphaera euphorbiae (Pk.) Berk. & Curt., powdery mildew. Ind. (1)

Neocosmospora vasinfecta E.F.Sm., on dead stems. S.Car. (2)

Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. N. Car. (2)

Phakopsora vignae (Bres.) Arth. (II,III), rust. P.R. (2). O and I unknown.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2)

Mosaic -- unidentified virus. Mich. (2)

GLYCYRRHIZA (LEGUMINOSAE)

GLYCYRRHIZA LEPIDOTA Pursh, AMERICAN LICORICE. Tall perennial of open, usually rich and moist ground in the Central and Western States, occasionally eastward to New York, useful as a soil binder and furnishes food for wildlife; sometimes a troublesome weed. It contains glycyrrhizin (licorice) the commercial source of which is G. glabra L.

Cylindrosporium glycyrrhizae Harkn., leaf spot. Calif.

Erysiphe polygoni DC., powdery mildew. N.Mex., N.Dak.

Microsphaera diffusa Cke. & Pk., powdery mildew. Colo., Mont., Wash., Wyo.

Septoria glycyrrhizae Ell. & Kell., leaf spot. Kans., Wash.

Uromyces glycyrrhizae (Rab.) Magn. (O,I,II,III), rust. N.Dak. to Tex., Calif. and Wash.; also on G. glutinosa Nutt., Calif.

HEDYSARUM (LEGUMINOSAE)

HEDYSARUM spp., SWEET-VETCH. Low perennial herbs of light open ground in the North and at high altitudes in the West; sometimes grown for ornament. H. boreale Nutt. is circumpolar, H. coronarium L. is intr. from Europe.

Heterodera marioni (Cornu) Goodey, root knot. On H. coronarium.

Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. N.Y. (sp.)

Septogloeum hedysari Solh., leaf spot. Wyo. On H. marginatum Greene.

Uromyces hedysari-obscuri (DC) Car. & Piccone (O,I,II,III), rust. Alaska, Col., Ida., Mont., N.Mex., S.Dak., Utah, Wyo. On H. boreale and spp.

LATHYRUS (LEGUMINOSAE)

LATHYRUS HIRSUTUS L., rough peavine. European biennial grown as a cover crop in sugar cane fields in the South.

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LATHYRUS cont.

Ascochyta sp., leaf and stem spot. La.
Mycosphaerella sp., stem spot, blight. Ala.

LATHYRUS LATIFOLIUS L., PERENNIAL (EVERLASTING) PEA. Climbing perennial of Europe, grown for ornament.

Aphanomyces euteiches Drechs., root rot. Wis.
Ascochyta lathyri Trail, stem spot. N.J.
Cercospora lathyrina Ell. & Ev., leaf spot. Ga.
Erostrotheca multiformis G.H.Martin & Charles, white mold. Wash.
Heterodera marioni (Cornu) Goodey, root knot. ? Fla.
Mycosphaerella sp. ( ? M. ontarioensis Stone), on leaves. N.J.
M. pinodes (Berk. & Blox.) Vest., on stems. Mont.
Ovularia sp., leaf spot. Calif.
Phyllosticta orobella Sacc., on leaves. Tex.
Septoria lathyri Ell. & Ev., on leaves. N.J.

LATHYRUS ODORATUS L., SWEETPEA. Climbing annual of southern Europe, important florists crop and widely grown in home gardens, especially in the North and far West.

Agrobacterium tumefaciens (E.F.Sm.) Conn, crown gall. Md., N.J., Va. Probably in part confused with fasciation; for which see Corynebacterium fascians.
Alternaria sp. ( ? A. tenuis Nees ex Wallr.), secondary leaf spot. Md., Mass., N.J., N.Y., Pa., Tex.
Aphanomyces euteiches Drechs., root rot. Ind., Mich., Wis.
Ascochyta sp. ( ? A. lathyri Trail), stem spot. Conn., Minn., Mo., W.Va., Wis. Root rot, Kans.
Botrytis cinerea Pers. ex Fr., gray mold blossom and shoot blight. Alaska, Minn., Pa., Wash., probably general.
(Cladosporium album Dowson): Erostrotheca multiformis.
Colletotrichum pisi Patterson, leaf spot. Ala., Fla., Ga., S. Car.
Corynebacterium fascians (Tilford) Dowson, fasication. Calif., Colo., Conn., Ga., Ind., Mich., Mo., N.J., N.Y., Ohio, Okla., Pa.
Cuscuta indecora Choisy, dodder. Tex.
Erostrotheca multiformis G.H.Martin & Charles (Cladosporium album Dowson as identified in the U.S.), white mold. Mass., N.J., N.Y., Pa., Tex. Observed only on greenhouse crops.
Erwinia lathyri (Manns & Taub.) Magrou, bacterial streak. Del., Ga., Mass., N.J., N.Mex., N.Y., Okla., Pa., Tex., Wash. Possibly a complex disease, involving virus streak.
Erysiphe polygoni DC., powdery mildew. Frequently reported, especially on greenhouse crops but sometimes confused with Microsphaera alni.
Fusarium spp., stem and root rot, wilt. Occasional to prevalent on greenhouse crops, sometimes also in the open. Commonly ascribed to F. lathyri Taub.,=F. solani (Mart.) Appel & Wr. f. pisi (F.R.Jones) Snyder & Hansen, also known as F. solani

LATHYRUS cont.

var. martii (Appel & Wr.) Wr. f. 2 Snyder, and reported in Colo., Fla., Ind., Miss., N.Y., N.Dak., Ohio, Tex. F. oxysporum Schlecht. f. vasinfectum (Atk.) Snyder & Hansen is reported as the cause of wilt in Fla. and N.Y.

Gloeosporium sp. (G. rufomaculans (Berk.) Thuem.). See Glomerella cingulata.

Glomerella cingulata (Ston.) Spauld & Schrenk., anthracnose, blossom and shoot blight. General except the Pacific Coast.

Heterodera marioni (Cornu) Goodey, root knot. Mass., N.J., N.Y., Tex.

Isariopsis griseola Sacc., leaf spot. Conn.

Microsphaera alni DC. ex Wint., powdery mildew. General, especially on greenhouse crops.

Mycosphaerella pinodes (Berk. & Blox.) Vest. stem and leaf spot. Minn., Wis.

Phyllosticta orobella Sacc., leaf spot. Tex.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

Phytophthora cactorum (Cohn & Leb.) Schroet., root rot. Conn.

Pratylenchus pratensis (De Man) Filip., root nematode associated with root blackening. N.J., N.Y.

Pseudomonas pisi Sackett, bacterial leaf spot. Ind., Wis.

Pythium spp., root rot, damping off. Calif., Conn., Md., N.J. P. debaryanum Hesse identified in Conn., N.J. and N.Car.; P. ultimum Trow, in Mass.

Ramularia sp., leaf spot. N.Y.

Rhizoctonia solani Kuehn, damping off, root and stem rot. General.

Sclerotinia sp. ( ? S. sclerotiorum (Lib.) DBy.), stem rot, wilt. Md., Pa.

Sclerotium rolfsii Sacc., southern blight. Fla.

Thielaviopsis basicola (Berk. & Br.) Ferr., black root rot. Conn. to Ohio, Ill. and Minn., also Fla., Colo., and Pacific Coast.

Verticillium sp. (V. albo-atrum Reinke & Berth.), wilt. N.J., N.Y.

Bud drop -- physiological, usually ascribed to unbalanced nutrition (deficiency of phosphorus and potassium), augmented by low light intensity. Occasional in greenhouse crops.

Mosaic -- various viruses. General. Infection either natural or from artificial inoculation with the following viruses has been reported: Marmor leguminosarum Holmes (Pisum virus 2 K.M.Sm.), M. pisi Holmes (Pisum virus 1 K.M.Sm.), yellow bean mosaic virus (Phaseolus virus 2 K.M.Sm), Marmor efficiens F.Johns., M. repens F.Johns., and M. trifolii Holmes. Flower breaking (striping) is commonly caused by common pea mosaic virus, M. leguminosarum

Spotted wilt -- Lethum australiense Holmes (Lycopersicon virus 3 K.M.Sm.) Calif.

Streak -- suspected virus or virus complex, the components not identified; perhaps also in part bacterial (see Erwinia lathyri). Eastern States. Susceptibility of sweetpea, with nec-

LATHYRUS cont.

rotic reactions, has been demonstrated to the following viruses: Marmor cucumeris Holmes (Cucumis virus 1 K.M.Sm.), M. lactucae Holmes (Lactuca virus 1 K.M.Sm.), M. medicaginis Holmes (Medicago virus 1 K.M.Sm.); and also M. annularium McK. (Nicotiana virus 12 K.M.Sm.).

LATHYRUS spp., PEAVINE, VETCHLING. Native perennials, decumbent to climbing, sometimes grown for ornament in wild gardens as L. MARITIMUS (L.) Bigel. (1) and L. ORNATUS Nutt. (2); a few spp. of food value to wildlife, as L. PALUSTRIS L. (3)

Alternaria tenuis Nees ex Wallr., secondary leaf spot. Vt. (3)
Ascochyta lathyri Trail, stem and pod spot. Wash. (1)
A. pisi Lib., leaf spot. Calif., Wis. (3)
Cercospora lathyri Dearn. & House, leaf spot. Mass., N.Y. (1)
C. viciae Ell. & Holw. Wis. (3)
Erysiphe polygoni DC., powdery mildew. Alaska (1,3), Wash. (1)
Microsphaera alni DC. ex Wint., powdery mildew. Ill., Mich., N.Y. Ohio, Wis. (3)
Mycosphaerella pinodes (Berk. & Blox.) Vest., basal stem rot. On L. tingitanus L., Miss.
Phleospora reticulata Ell. & Ev., leaf spot. Me. (1)
Phyllosticta orobella Sacc., leaf spot. Mass., N.Y. (1)
P. suecica Bub. & Vleug. Conn. (1)
Ramularia roseola Bub. & Vleugel, leaf spot. Alaska (3)
Septoria astragali Rob. ex Desm., leaf spot. Mass., Vt. (1)
S. emaculata Berk. & Curt., leaf spot. N.Y., Wis. (3).
Uromyces fabae (Pers.) DBy. (0,I,II,III), rust. On (2),(3) and spp. throughout their range.
Urophlyctis lathyri Palm, stem and leaf gall. On L. sulphureus Brewer, Oreg.

LENS (LEGUMINOSAE)

LENS ESCULENTA Moench, LENTIL. European annual, grown there for edible seeds, rarely cult. in America.

Heterodera marioni (Cornu) Goodey, root knot.

LESPEDEZA (LEGUMINOSAE)

LESPEDEZA spp. (endemic), BUSH-CLOVER. Perennial herbs of prairies and open woods from the Atlantic and Gulf Coasts to Minn. and Tex.; useful as ground cover and as food for wildlife. The following spp. particularly included: L. CAPITATA Michx. (1), L. HIRTA (L.) Hornem. (2), L. REPENS (L.) Bart. (3), L. STUVEI Nutt. (4), L. VIOLACEA (L.) Pers. (5), and L. VIRGINICA (L.) Britt. (6).

Cercospora latens Ell. & Ev., leaf spot. Kans. (1)
C. lespedezae Ell. & Dearn., leaf spot. Ill., N.Y. (2), Wis. (1, 5)

LESPEDEZA cont.

Cuscuta spp., especially C. arvensis Beyrich. Occasional, Pa. to Ala. and Tex.

Diaporthe arctii (Lasch) Nits., on stems. Va. (6)

Didymella sp., on stems of L. frutescens (L.) Britt., Ga.

Microsphaera diffusa Cke. & Pk., powdery mildew. Conn., Ill., Minn., N.Y. (1); Ill., Pa. (2); Mass., Miss., Va., W.Va. (spp.)

Parodiella perisporioides (Berk. & Curt.) Speg., black mildew. Kans., Mo., S.Car. (spp.)

Phyllachora lespedezae (Schw.) Sacc., tar spot. On all spp. named, more or less general throughout their range.

Physalospora obtusa (Schw.) Cke., on stems. Ga. (6)

Sclerotium rolfsii Sacc., root and stem rot. On L. simulata Mack. & Bush, Fla.

Uromyces lespedezae-procumbentis (Schw.) Curt. (0,I,II,III), rust. On all spp. named, general throughout their range.

Fasciation -- ? Corynebacterium fascians (Tilford) Dowson. Va. (2)

LESPEDEZA spp. (introduced). L. CUNEATA (Dumont) D. Don (L. sericea Miq.), CHINESE LESPEDEZA (1); L. STIPULACEA Maxim., KOREAN L. (2); L. STRIATA (Thunb.) H. & A., COMMON L. (Japan clover) (3). Perennial (1) or annuals (2,3) of eastern Asia, grown as forage and cover crops in the Southeastern and South Central States; (3) is also naturalized in fields and waste ground from Pa. to Fla., Tex. and Kans.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Okla. (sp.)

Alternaria sp., leaf spot ( ? secondary). Del., Md. (1)

Catosphaeropsis caulivora Tehon, stem canker, blight. Ill. (2)

Cercospora lespedezae Ell. & Dearn., leaf spot. Ill. (2)

Colletotrichum sp., leaf and stem spot. N.&S.Car. (1,2)

C. trifolii Bain & Essary, southern anthracnose, Ill. (2)

Corticium stevensii Burt. See Pellicularia koleroga.

Cuscuta sp. (especially C. arvensis Beyrich), dodder. Frequent throughout the range of cultivation.

Erysiphe polygoni DC., powdery mildew. S.Dak., Va. (3)

Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf spot. Ga., N.&S.Car., Va. (2,3)

Heterodera marioni (Cornu) Goodey, root knot. Ala. (3), Ga., Md. (1)

Kabatiella caulivora (Kirchn.) Karak., stem canker. Ill. (2)

Macrophomina phaseoli (Maub.) Ashby, charcoal rot, stem canker. Ga., Ill. (2); Tex. (1)

Microsphaera diffusa Cke. & Pk., powdery mildew. Ill. (2) based on conidia only; Ala., Ga., Ill., Miss., S.Car., Va. (3).

Mycosphaerella sp., blight, stem necrosis. Ala.

Pellicularia koleroga Cke. ( ? Corticium stevensii Burt) brown leaf patch. N.Car. (2)

Phytomonas lespedezae Ayers, Lefebvre & H.W.Johnson, bacterial

LESPEDEZA cont.

wilt. Ga., Ill., Kans., Mo., N.Y. (2); Tenn., Va. (2,3). Probably general throughout the range of cultivation of the annual lespedezas; infectious experimentally to (1) and several spp. of endemic lespedezas.

Pseudoplea briosiana (Poll.) Hoehn. (Pleosphaerulina briosiana Poll.), leaf spot. Ga. (1)

Rhizoctonia sp. ( ? solani Kuehn), damping off, root rot. Ga. (Sclerotium bataticola Taub.): Macrophomina phaseoli.

S. rolfsii Sacc., southern blight. Ark. (2), N.Car. (2,3), Tex. (2). Probably general in the Southeastern States.

Stemphylium sp., leaf spot. Md. (sp.)

LOTUS (HOSACKIA) (LEGUMINOSAE)

LOTUS PURSHIANUS F.E. and E.S.Clements (L. americanus (Nutt.) Bisch.) BIRDSFOOT TREFOIL, DEERVETCH (1). Annual of dry fields and plains from Minn. to Ark., Calif. and Wash. L. CORNICULATUS L. (2) perennial herb of Europe, established on waste ground near the Atlantic Coast and inland. Both spp. furnish food for wildlife. A few other spp., most western in distribution, also are listed.

Alternaria sp., secondary leaf spot. Va. (2)

Erysiphe polygoni DC., powdery mildew. Calif., Minn., Oreg., S. Dak., Wash. (1): also on other native spp. in this range.

Fusarium sp., wilt. N.Y. (2)

Heterodera marioni (Cornu) Goodey, root knot. Ala., Calif., ? Fla. (2)

Mycosphaerella sp. (Sphaerella hosackiae Cke. & Harkn.), on stems of L. scoparius (Nutt.) Ottley, Calif.

Ovularia lotophaga Ell. & Ev., leaf spot. N.Dak. (1); Calif., Oreg. (spp.)

Peronospora lotorum Syd. ( ? P. trifoliorum DBy.), downy mildew. Oreg. (1)

Phoma hosackiae Cke. & Harkn., on stems of L. scoparius. Calif.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1)

Pleospora leguminum (Wallr.) Rab. ( ? P. herbarum (Pers. ex Fr.) Rab.), on stems. Calif. (1)

Pyrenopeziza compressula Rehm, on stems of L. stipularis (Benth.) Greene, Calif.

Ramularia schulzeri Baeumler, on leaves. Nebr., Tex. (1)

Synchytrium sp., leaf gall. ? Calif.

Thecaphora deformans Dur. & Mont., seed smut. On L. humistratus Greene in Ariz., and L. micranthus Benth. in Wash.

Uromyces striatus Schroet. var. loti (Blytt.) Arth. (II,III), rust. Calif. (spp.) O and I on Euphorbia spp. in Europe.

Sclerotinia sp., wilt, Wash. (sp.)

Septoria hosackiae Harkn., leaf spot. On L. strigosus (Nutt.) Greene. Calif.

LUPINUS (LEGUMINOSAE)

LUPINUS spp., LUPINE*. A. Spp. used for soil improvement, as L. ALBUS L., WHITE L. (1); L. ANGUSTIFOLIUS L., EUROPEAN BLUE L. (2); L. LUTEUS L., EUROPEAN YELLOW L. (3). Annuals, long cult. in Europe for edible seeds, forage and soil renovation; less so in the U.S., partly because they may contain poisonous alkaloids (now eliminated in some vars). (2) is coming into use as a cover crop in the Southeastern States.

Botrytis cinerea Pers. ex Fr., gray mold blight. Fla., Ga. Chiefly on (3); associated with low temperature injury.

Diplodia theobromae (Pat.) Nowell, dieback. Ala. (1). Conidial stage of Physalospora rhodina (Berk. & Curt.) Cke.

Fusarium spp., root rot, wilt, seedling blight. Southeastern and Gulf States, Calif., Hawaii. The following specific identifications reported:

F. moniliforme Sheldon, root rot ( ? secondary), stem canker. Ala., Ga. (1,2,3)

F. oxysporum Schlecht. f. radicis-lupini Weimer, root rot. Ala., Fla., Ga. (1,2,3). Probably the same fungus has also been reported as F. vasinfectum Atk. = F. oxysporum f. vasinfectum.

F. solani (Mart.) App. & Wr. f. lupini Weimer, root rot. Fla. (2). Experimentally pathogenic to (1) and (3). May be identical with F. solani f. pisi (F. R. Jones) Snyder & Hansen, which is also pathogenic to (2) and (3)

Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose. Fla. (2). Pathogenic also to (1)

Heterodera marioni (Cornu) Goodey, root knot. Ala., Fla., Ga. (1,2,3), Hawaii (1)

Mycosphaerella sp., stem necrosis. Ala.

Phytophthora parasitica Dast., stem rot. Fla. (1).

Pythium spp., root rot. Ala., Ga. P. debaryanum Hesse and P. ultimum Trow have been reported on Lupinus spp. in Calif. P. graminicolum Subr. has been shown pathogenic experimentally to (1) and (3).

Rhizoctonia solani Kuehn, damping off, secondary root rot. Ala., Fla., Ga. (1,2,3).

Sclerotinia sclerotiorum (Lib.) DBy., stem rot. La. (2)

Sclerotium rolfsii Sacc., southern blight. Ala., Fla., Ga. (1,2,3)

LUPINUS spp. B. Ornamentals. The following native spp. (among others) are cult. for ornament: L. PERENNIS L., SUNDIAL L. (1); L. POLYPHYLLUS Lindl., WASHINGTON L. (2); and L. SUBCARNOSUS Hook., TEXAS L. (3). Garden lupines are derived mostly from introduced spp., as L. hartwegii Lindl., L. hirsutus L., L. pubescens Benth., and others; host identification is usually lacking in records pertaining to these. Various

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* This supplements the records on arborescent Lupinus spp. published earlier in this series (PDR 25: 340-341. 1941) and covers only the species that are grown as cover crops or for ornament.

LUPINUS cont.

native spp. are sometimes grown in wild gardens.

Alternaria sp., leaf spot. Mass. (2)
Ascochyta sp. (chiefly A. pisi Lib.), blight, stem necrosis. Wis. (1); Conn. (sp.)
Botrytis cinerea Pers. ex Fr., gray mold blight. Mass. (2); Mont., N.Y. (sp.)
Cercospora longispora Pk., leaf spot. N.Y., Wis. (1); Fla. (sp.)
C. lupini Cke., leaf spot. Oreg. (2); Fla., S.Car. (spp.)
C. lupinicola Lieneman, leaf spot. Tex. (3)
Colletotrichum sp., stem spot. Md. (sp.)
Cryptosporium lupini Cke., on stems. Calif. (sp.)
Cylindrosporium lupini Ell. & Ev., leaf spot. Calif. (spp.)
Erysiphe polygoni DC., powdery mildew. Mass. to Md., Ill. and Wis. (1); Oreg. (2); Tex. (3). Widespread on native spp. in the West.
Fusarium sp., root rot. N.J., Va. (sp.)
Hadrotrichum globiferum (Ell. & Ev.) J.J.Davis, leaf blight. Calif., Colo., Oreg., Wash., Wyo. (spp.)
Hendersonia lupini Cke. & Harkn., on stems. Calif. (sp.)
Macrophomina phaseoli (Maub.) Ashby, charcoal rot. On L. mutabilis Sweet, Calif.
Microsphaera sp., powdery mildew. N.J (sp.)
Ovularia sp., leaf spot. Wash.
Peronospora trifoliorum DBy., downy mildew. Wis. (1)
Phoma lupini Ell. & Ev., leaf and stem spot. On various native spp., Colo. to N.Mex., Calif. and Wash.
P. lupinicola Tracy & Earle, on stems. Colo. (sp.)
Phyllosticta ferax Ell. & Ev., leaf spot. On various native spp., S.Dak. to Colo., Calif. and Wash.
P. lupini Bonar, leaf spot. Calif. (spp.)
Pratylenchus pratensis (De Man) Filip., root nematode. Calif. (sp.)
Puccinia andropogonis Schw. var. onobrychidis (Burr.) Arth. (0, I), rust. Mich., Minn., N.Y., Wis. (1). II and III on Andropogon spp.
Pyrenophora chrysospora (Niessl) Sacc., on stems. Colo. (sp.)
Pythium debaryanum Hesse, stem rot. Tex. (3), Calif. (sp.)
P. ultimum Trow, root rot. Calif. (sp.)
Ramularia lupini J.J. Davis, Wash.
Rhizoctonia solani Kuehn, damping off, root and stem rot. Conn. (1), Tex. (3)
Sclerotinia sclerotiorum (Lib.) DBy., stem rot, wilt. N.Y. (1); La. (sp.)
Sclerotium rolfsii Sacc., stem rot, southern blight. Southern States, Kans. (sp.)
Septogloeum lupini Ell. & Ev., leaf spot. Mich. (1); Calif., Alaska (sp.)
Septoria lupinicola Ell. & Dearn., leaf spot. Wis. (1)
Stictochorella lupini Syd., leaf spot. Calif., Wash., Alaska (spp.)
Thecaphora deformans Dur. & Mont., seed smut. Colo., Wyo. (spp.)
Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. ? Iowa, Wis. (sp.)

LUPINUS cont:

Uromyces lupini Berk. & Curt. (0,I,II,III), rust. Calif., Oreg., Wash. (2); on various native spp. from Nebr. to Calif., Wash. and Mont.

U. occidentalis Diet. (II,III), rust. On various native spp. from Mont. to N.Mex., Calif. and Wash. 0 and I on Euphorbia spp.

Mosaic -- unidentified virus. Hawaii (sp.)

Ring spot -- unidentified virus. Wash. (sp.)

Spotted wilt -- virus (Lethum australiense Holmes, Lycopersicon virus 3 K.M.Sm.) Tex. (3)

DIVISION OF MYCOLOGY AND DISEASE SURVEY

## DAMAGED PEANUTS IN ALABAMA IN 1945

Coyt Wilson

Damaged peanuts cost farmers of Henry and Houston Counties more than a million dollars in 1945. Peanuts delivered to the buyers by the farmers in these two counties contained as much as 45 percent damage in some lots. The average was about 10 percent, with approximately one-half of the peanuts containing more than 7 percent damage.

These facts were obtained by the writer during the harvesting season. Data were collected on date of digging, method of curing, amount of rainfall, and the percentage of damage. The high percentage of damage in the extreme southeastern part of the State appears to have been caused by a combination of excessive rainfall and poor curing methods.

Table 1. Rainfall in Southeast Alabama in September and October, 1945

| Date | Inches Rainfall | Date | Inches Rainfall |
|---|---|---|---|
| Sept. 2 | 1.90 | Oct. 2 | 0.06 |
| Sept. 4 | 0.25 | Oct. 6 | 0.18 |
| Sept. 6 | 0.22 | Oct. 22 | 0.58 |
| Sept. 11 | 0.39 | Oct. 25 | 0.65 |
| Sept. 12 | 1.30 | Total | 1.47 |
| Sept. 13 | 2.50 | | |
| Sept. 19 | 0.50 | | |
| Sept. 20 | 0.58 | | |
| Sept. 22 | 0.46 | | |
| Sept. 28 | 0.05 | | |
| Sept. 29 | 0.33 | | |
| Total | 8.48 | | |

In Table 1 the rainfall for the months of September and October is given. It will be noted that 11 rains fell in September totaling 8.44 inches. This is about twice the long-time average for this section of the State. In October only four rains fell, totaling only

1.47 inches.

Digging started early in September in the southern part of Houston County. In the northern part of the Alabama peanut belt, digging was not completed until after October 15. Thus, the peanuts dug in September were cured under very unfavorable weather conditions, while those that were dug after October 1 had the advantage of cool, dry weather.

About 65 percent of the peanuts in the vicinity of Headland, Midland City, and Dothan, were cured in windrows or in cocks. The greatest amount of damage (45 percent) was found in peanuts dug early in September and cured in large cocks. Considerable damage was often encountered in windrow-cured peanuts. In a few instances, peanuts dug during the rainy season in September and cured in stacks contained as little as 2 or 3 percent damage. This illustrates the possibility of producing good quality peanuts even under adverse weather conditions.

In the adjoining seven peanut-producing counties, more than 95 percent of the peanuts were cured in stacks. Very few of the peanuts in these counties contained more than 10 percent damage, and the average was about 5 percent. Many lots contained less than the allowable 2 percent. Most of these peanuts were dug during late September or in early October. The favorable weather that prevailed at the time, together with the practice of curing in the stack rather than on the ground, probably accounts for the lower percentage of damage.

The term "damage" used here includes both concealed damage and visible damage of the seed. Experiments underway at the Alabama Agricultural Experiment Station indicate that these are usually different phases of the same disease. Under favorable conditions for the progress of the disease, "concealed damage" soon becomes "visible damage."

Isolations have been made from numerous lots of damaged seed. The predominant organism recovered from seeds with concealed damage is Diplodia theobromae. From visibly damaged seed a number of additional organisms are obtained, including Fusarium spp., Sclerotium bataticola, Rhizoctonia spp., miscellaneous molds, and bacteria.

ALABAMA AGRICULTURAL EXPERIMENT STATION
AUBURN, ALABAMA

## POWDERY MILDEW OF ANNUAL LESPEDEZAS

J. L. Weimer and Julius M. Elrod

Although the writers' observations have not been extensive, those made during the past several years indicate that powdery mildew (Microsphaera diffusa Cke. and Peck) is not a serious disease of annual lespedezas in Georgia. During the past summer, however, this disease was rather widely distributed in a nursery planted by the junior author at Experiment, Georgia. Since the lespedezas grown here are being widely tested under the direction of Mr. Roland McKee, U.S.Department of Agriculture, Beltsville, Maryland, for the purpose of determining their adaptability and studying their reaction to dis-

seases in different parts of the country, it seems worth while to record the writers' observations on the reactions of these lespedezas to powdery mildew at this location.

The seriousness of the disease was rated by observation jointly by the writers, and in case of a difference of opinion an agreement was reached before a rating was recorded. The ratings were made on a scale of 0 to 10, the former figure representing one extreme, namely freedom of disease, and the latter the other extreme or very severe infection. The lespedezas were growing in 10-foot rows on Cecil loam soil, were seeded in the spring of 1945, and the notes were taken on August 29, 1945. Most of the lots are not named and hence are listed by the FC or FPI numbers under which they were received from Mr. McKee. The results of these observations are shown in Table 1.

The ratings given in the final column of Table 1 show that there was considerable variation in the severity of the disease on different lots, those of L. striata ranging from 1 to 6 and those of L. stipulacea from 0 to 9. The most severe infection of all was in FC 19604, a selection of Korean, and the next most severe was a strain of Kobe (FC 31852). Since these observations have extended over only one season, no final conclusions can be drawn, but the data indicate that there may be considerable variation in the susceptibility of these lots and this fact should be taken into account when selections for further improvement of the strains are being made.

Table 1. Severity of powdery mildew in different lots of annual lespedeza growing in nursery rows at Experiment, Georgia

| Species and common name | FC or FPI number | Severity of infection | Species and common name | FC or FPI number | Severity of infection |
|---|---|---|---|---|---|
| L. striata Kobe | 30932-6 | 2 | L. stipulacea Korean | Commercial | 0 |
| | 30932-14 | 2 | | 19601 | 1 |
| | 30932-19 | 2 | | 19604 | 9 |
| | 30932-21 | 2 | | 31249 | 1 |
| | 30934-2 | 1 | | 31249-3 | 3 |
| | 30935 | 3 | | 31475 | 0 |
| | 31821 | 2 | | 31476 | 3 |
| | 31824 | 3 | | 31480 | 0 |
| | 31825 | 4 | | 31481 | 1 |
| | 31827 | 1 | | 31493 | 0 |
| | 31838 | 2 | | 31757 | 1 |
| | 31839 | 5 | | 31818 | 0 |
| | 31840 | 2 | | 31819 | 3 |
| | 31842 | 2 | | 31820 | 1 |
| | 31843 | 2 | | 31850 | 0 |
| | 31846 | 1 | | 31851 | 1 |
| | 31847 | 5 | | 31853 | 4 |
| | 31852 | 6 | | 31854 | 2 |
| | Commercial | 2 | | 31855 | 2 |
| | | | | 31856 | 2 |
| | | | | FPI90533 | 0 |

Further indication that there is considerable variation in the resistance of lespedezas to powdery mildew, and also in the amount of disease present under different conditions, is shown by data collected by the senior author in the greenhouse in 1943 when natural inoculation resulted in a heavy infection in plants being used in another experiment. The lespedezas grown at that time and their reaction to powdery mildew are given in Table 2.

Table 2. Severity of powdery mildew resulting from natural inoculation of lespedeza in the greenhouse, Experiment, Georgia.

| Species | Common name | FC or FPI number | Severity of infection, Series 1 | Series 2 | Series 3 |
|---|---|---|---|---|---|
| Lespedeza striata | Tennessee 76 | 22664 | 9 | 9 | 9 |
| | Common (La.) | 22730 | 5 | 5 | 5 |
| | Kobe | 22731 | 9 | 9 | - |
| | Kobe | 30935 | 9 | 9 | 9 |
| | Common | 31057 | 10 | - | - |
| Lespedeza stipulacea | Korean | 19601 | 9 | 9 | 5 |
| | | 19604 | 10 | - | 9 |
| | | 30888 | 9 | 6 | 9 |
| | | 31249 | 4 | 5 | 9 |
| | | 31475 | 1 | 1 | 2 |
| | | 31476 | 2 | 1 | 2 |
| | | 31478 | 0 | 0 | 0 |
| | | 31480 | 2 | 1 | 1 |
| | | 31481 | 8 | 5 | 5 |
| | | 31493 | 3 | 2 | 0 |
| | | 65280 | - | 9 | 10 |
| | | 90553 | 9 | 8 | 10 |

Only one lot shown in Table 2, namely FC 31478, remained free of disease in all three replications, although some other lots were only slightly affected. FC 19604 rated very high in the greenhouse as well as in the field, whereas FC 19601 rated high in the greenhouse and low in the field. Both FC 31249 and FC 31481 were moderately to severely infected in the greenhouse and only slightly in the field. Other lots such as FC 31475, FC 31476, FC 31480, and FC 31493 were only slightly infected in both the field and greenhouse. In the greenhouse single plants were noted in several lots that were entirely free from the disease, even though growing in pots among many other badly diseased plants. This seemed to suggest the possibility that resistant plants could be selected from a number of lots. However, no disease-free plants were noted in the field.

Johnson, Lefebvre, and Ayers[1] show the reaction to powdery mildew

1 H.W.Johnson, C.L.Lefebvre, and T.T.Ayers. Powdery mildew of lespedeza. Phytopath. 30: 620-621. 1940.

of still other lots of lespedeza as well as of some of those studied by the present writers. Under their conditions the disease on lots FC 19604 and 19601 was not severe. They state that "It would appear from these data that strains of Lespedeza striata are more susceptible than are strains of L. stipulacea." Our results show that there may be a general trend in that direction but that there are many exceptions.

Perithecia of the causal fungus were not found either in the greenhouse or field, hence the identity of the species remains unconfirmed.

DIVISION OF FORAGE CROPS AND DISEASES,
AND GEORGIA AGRICULTURAL EXPERIMENT STATION,
EXPERIMENT, GEORGIA

## A PARTIAL SURVEY OF THE GENUS LYCOPERSICON FOR RESISTANCE TO PHYTOPHTHORA INFESTANS

Mathias C. Richards[1] and Raymond W. Barratt[2]

Seeds from several species of the genus Lycopersicon were obtained from various sources[3] and tested for resistance to Phytophthora infestans. Common and rare types of commercial, both foreign and domestic, varieties of L. esculentum were tested for resistance. One to several selections of L. pimpinellifolium, L. hirsutum, L. hirsutum var. glabratum, L. hirsutum var. cerasiforme, L. peruvianum, L. peruvianum var. humifusum, and L. chilense were also inoculated.

The inoculations were made on greenhouse-grown plants in a moist chamber at relative humidities of 95 percent upwards and at temperatures of 18 to 24° C.

The inoculum used was taken from Green Mountain potato tubers obtained from various sources. Inoculum from potato passed through tomato foliage, variety Marglobe, seven times did not show any higher virulence on other tomato varieties or on potato foliage than did the original inoculum from potato on tomato foliage. The age of the conidia and the factors of humidity and temperature during inoculation seemed to be more important in determining the degree of infection than the source or virulence of the inoculum.

To secure the inoculum, late-blight-infected tubers were cut and placed in a small moist chamber at 17 to 19° C. The conidia, which developed abundantly on the cut surfaces, were washed off with charcoal-purified distilled water. The conidial suspension was then placed in a shallow container and maintained at 12 to 15°C for an hour and a half. The resulting spore suspension, microscopically confirmed for swarming, constituted the inoculum. The plants were grown in

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3 The writers wish to thank Dr. G.B.Reynard, Dr.A.F.Yeager, Dr.A.L. Harrison, Dr.V.R.Boswell, Dr.H.L.Blood, and The Division of Plant Exploration and Introduction, The Bureau of Plant Industry, U.S.D.A. for sending seeds of the varieties used.

3 1/2-inch pots. Although not always of the same age because of the necessity of propagating certain lines asexually, they were in a vigorous growing condition when tested. Several hours prior to inoculation, the plants were thoroughly watered and placed in the moist chamber. The inoculum was sprayed onto the leaves with a DeVilbiss hand atomizer, and care was taken to wet the leaves thoroughly. No records were made on fruit infections, as many of the selections were not kept until fruits developed. As a measure of the inoculum potential a potato plant or a commercial tomato variety known to be highly susceptible, usually Marglobe, was included with each set of plants inoculated. When poor infection results were obtained on the check plants, the data were discarded and the test repeated.

After inoculation the plants were incubated in the moist chamber for 36 to 48 hours and then removed to conditions of lower humidity for 48 hours. The plants were then returned to the moist chamber for a minimum of 12 hours before final readings were taken.

A scale showing degrees of infection was established as follows:

0 - no infection
1 - one or two to a few small necrotic spots
2 - many spots, each separate and small
3 - many spots, each separate and large
4 - many spots coalesced - severe infection
S - fungus sporulating

Table 1. Susceptibility of Lycopersicon species and varieties to Phytophthora infestans.

| Variety | Range in Susceptibility | Variety | Range in Susceptibility |
|---|---|---|---|
| L. hirsutum | | L. pimpinellifolium cont. | |
| PI 126,445 | 0-4 | PI 126,927 | 4 |
| PI 126-446 | 0-4 | PI 126,931 | 4 |
| PI 126-447 | 0-4 | PI 126,932 | 4 |
| PI 126-449 | 1-4 | PI 126,933 | 4 |
| PI 126-936 | 0-3 | PI 126,934 | 4 |
| PI 127-826 | 0-3 | PI 126,937 | 4 |
| PI 127-827 | 0-3 | PI 126,941 | 4 |
| | | PI 126,943 | 4 |
| L. hirsutum | | PI 126,947 | 4 |
| var. glabratum | | PI 127,805 | 4 |
| PI 129,157 | 0-4 | PI 127,833 | 3 |
| | | PI 129,143 | 3 |
| L. pimpinellifolium: | | | |
| PI 79,532A | 4 | L. esculentum | |
| PI 79,532B | 4 | PI 102,719 | 4 |
| PI 126,433 | 2-4 | PI 105,267 | 4 |
| PI 126,436 | 2-4 | PI 115,214 | 4 |
| PI 126,924 | 4 | PI 115,951 | 4 |
| PI 126-925 | 4 | PI 116,047 | 0-4 |

Table 1 cont.

| Variety | Range in Susceptibility | Variety | Range in Susceptibility |
|---|---|---|---|
| L. esculentum cont. | | L. esculentum cont. | |
| PI 117,228 | 4 | PI 129,135 | 4 |
| PI 118,407 | 4 | PI 129,882 | 3 |
| PI 118,409 | 4 | PI 134,208 | 3S |
| PI 118,787 | 4 | PI 135,022 | 2-4 |
| PI 118,789 | 4 | PI 135,842 | 4 |
| PI 118,790 | 4 | PI 135,844 | 4 |
| PI 121,438 | 4 | PI 135,906 | 1-4 |
| PI 123,436 | 1-4 | PI 136,452 | 4 |
| PI 123,438 | 4 | PI 138,618 | 4S |
| PI 124,038 | 4 | PI 146,083 | 4S |
| PI 124,039 | 4 | PI 146,084 | 4S |
| PI 124,133 | 4 | PI 146,085 | 1-4 |
| PI 124,163 | 4 | PI 146,086 | 4 |
| PI 126,414 | 4 | PI 146,087 | 4 |
| PI 126,908 | 2-3 | PI 146,088 | 4 |
| PI 126,910 | 4 | PI 146,089 | 4 |
| PI 126,913 | 4 | PI 146,090 | 4 |
| PI 126,914 | 4S | PI 146,091 | 4 |
| PI 126,919 | 2-3 | PI 146,092 | 4 |
| PI 126,923 | 4 | PI 146,093 | 4 |
| PI 127,813 | 4 | PI 146,094 | 4 |
| PI 127,818 | 4S | PI 146,129 | 4 |
| PI 127,824 | 4 | PI 148,720 | 4 |
| PI 128,174 | 4 | | |
| PI 128,194 | 1-4 | L. esculentum | |
| PI 128,217 | 4 | var. pyriforme | |
| PI 128,285 | 4-4S | PI 126,452 | 2-4 |
| PI 128,587 | 4 | PI 135,907 | 4 |
| PI 128,602 | 4 | | |
| PI 128,611 | 0-4 | L. esculentum | |
| PI 128,634 | 4 | var. cerasiforme | |
| PI 129,036 | 4 | PI 126,950 | 4 |
| PI 129,039 | 4 | PI 127,814 | 4 |
| PI 129,047 | 4 | | |
| PI 129,050 | 4 | L. peruvianum | |
| PI 129,066 | 4 | PI 126,946 | 4 |
| PI 129,075 | 4 | | |
| PI 129,104 | 3 | L. peruvianum | |
| PI 129,109 | 4S | var. humifusum | |
| PI 129,115 | 4 | PI 127,829 | 3-4 |
| PI 129,125 | 4 | | |
| PI 129,129 | 4 | L. chilense | 4S |

Table 1 cont.

| Hybrids | Range in Susceptibility |
|---|---|
| PI 114,969 L. esculentum x L. pimpinellifolium | 4 |
| Early Chatham x L. hirsutum (PI 127,826) $F_1$ | 4 |
| L. peruvianum (PI 129,946) x Michigan State $F_2$ selections | 3 |
| (L. hirsutum x Victor) x Early Chatham $F_2$ selections | 4 |
| (L. hirsutum x Victor) x Victor $F_2$ selections | - |
| Early Chatham x Pennheart $F_2$ selections | 4 |
| John Baer x Victor $F_4$ selections | 3-4S |

| Commercial varieties | Range in Susceptibility | Commercial varieties | Range in Susceptibility |
|---|---|---|---|
| Bay State | 4 | Orange King | 3S-4S |
| Danish Export | 4 | Pan America | 4S |
| Danish Extra Early | 4S | Pennheart | 3 |
| Devon Surprise | 4 | Pepper | 4 |
| Earliana | 2S | Potato Leaf | 3 |
| Early Chatham | 4S | Red Heart | 4 |
| Erste Ernte | 4 | Red Skin | 4S |
| Fargo Mordan | 4 | Riverside | 3 |
| Fargo Yellow Pear | 4S | Rutgers | 4 |
| Grothen's Globe | 4 | Scarlet Dawn | 4S |
| John Baer | 4 | Targinnie Red | 3-4 |
| King George | 2S | Trellis 22 | 4 |
| Marglobe | 4S | Vetomold | 4 |
| New Hampshire Victor | 4 | Window Box | 4S |

From Table 1 it will be noted that there is a wide range in the susceptibility readings for the L. hirsutum group. It was necessary to conduct several inoculation trials before the complete susceptibility of the plants in this species could be determined. Because of the waxy and pubescent nature of the leaves, inoculation conditions had to be ideal before type 4 readings could be obtained.

In certain tests it appeared that plants affected with the mosaic virus (Marmor tabaci var. vulgare) were resistant to the late blight pathogen. In limited tests plants of PI 126,946 (L. peruvianum) PI 127,829 (L. peruvianum var. humifusum), PI 129,022 (L. pimpinellifolium) and Marglobe (L. esculentum) were inoculated with the virus. When mosaic symptoms had developed, diseased and healthy plants were inoculated with the late blight pathogen. All developed severe, type 4, symptoms. Under the conditions of these tests, the virus did not impart resistance to P. infestans.

Under conditions made ideal for inoculation and infection, all of the 137 species and selections shown in Table 1 proved highly susceptible to attack from the late blight pathogen. Production of conidia by the pathogen was not common on the leaves of the varieties tested even when the plants became severely infected and when other factors were favorable, as shown by abundant sporulation on the potato plants used as checks. Abundant conidial production was observed on the leaves and stems of L. chilense and not infrequently on the leaves of some of the commercial varieties.

Slight differences in resistance to P. infestans may exist within the genus Lycopersicon, particularly in the field when conditions are not always ideal for infection; but of the plants tested none were found to be highly resistant or immune to the late blight pathogen.

NEW HAMPSHIRE AGRICULTURAL EXPERIMENT STATION

## AN EPIPHYTOTIC OF RHIZOPUS SOFT ROT OF GREEN-WRAP TOMATOES IN CALIFORNIA

Kenneth F. Baker

In mid-August, 1944, a commercial packing house in Oxnard, Ventura County, California, had heavy losses from soft rot caused by Rhizopus nigricans Ehr. in nearly all cars of green-wrap tomatoes shipped east by rail. Although minor sporadic losses had been experienced in other years, this situation was sufficiently unusual to warrant observation and record. Tomatoes shipped from California often develop considerable Rhizopus decay, perhaps because of the long haul to market. In the years 1922-30 terminal inspection records showed an average of 3.88 percent Rhizopus decay for California fruit and 2.44 for 4 States nearer to market (16).

At the conclusion of the 1943 season, because of the labor shortage, cull tomatoes had decayed in the picking boxes before they were finally dumped. On the cardboard liners and inside surfaces of nearly all of the boxes a crust of dried, decayed host tissue, and mycelium, sporangiospores, and zygospores of Rhizopus had developed. The fungus was still viable in September, 1944 on samples of boxes and cardboard pads which had been stored in a barn during the winter. Likewise, the fungus was still viable in November, 1945 on cardboards collected in August, 1944. This is not unusual, since McCrea (12) found the sporangiospores capable of germination after 30 years under favorable conditions and others (4,5,14) have reported survival for 1 to 2 years. In limited tests the zygospores could not be germinated, confirming the difficulties reported (6) for this fungus. The sporangiospores, therefore, probably were the means of survival of the fungus in this instance.

In most of these fungus crusts small bits of gravel, soil, sticks, etc., were lodged. The firm green fruit dumped into the boxes in the field and hauled in them to the packing shed rubbed against these sharp fragments and were thus inoculated. Similar infection of grapes from Rhizopus-infested cork packing and of peaches from picking boxes

have been reported in Australia (8,9). The burlap picking sacks had not been used before and were found not to be a source of infection of the tomatoes. In each previous season new boxes and liners had been used, but the war-shortage of shook and cardboard had made this impossible in 1944.

Within 2 days after the fruit was brought to the packing shed it was run over a grading table, and No. 1 and No. 2 green-wrap tomatoes were packed and shipped east. At the time of this first sorting completely rotted fruits were observed; they were being dumped in large barrels in the shed and, since many had sporulated, supplied a source of spore contamination of the air in the packing house. Since the green fruit was run over the grading table, conveyer belts, sizing machinery, and packing bins, all of which were exposed to this spore shower, it is not surprising that one or more fruits per packed box should develop infections at tiny wounds resulting from these operations. Such infected fruit would leak and develop a "nest" by time of arrival.

Fruit rejected at this grading was placed back in the boxes and stacked in the same room until pink-ripe, when it was packed and sent to the Los Angeles market. There was much Rhizopus soft rot in these fruits, which also were dumped in the barrels. They were then sorted 2 or 3 times as they ripened and, with this repeated handling and continued exposure to infection, a high percentage decayed. The total picture was thus one of cumulative inoculum, infection, and decay, starting from a carry-over of the fungus. Most packing houses dispose of tomatoes not used for green-wrap shipment by prompt sale to other packers, who sell them on the Los Angeles market.

Infection Experiments--Rhizopus generally is regarded as a wound parasite. While this is true as far as infection by spores is concerned, the common occurrence of nests of infected fruit in shipped boxes indicates that injuries are not necessary for infection by contact with decayed tissue. A comparable situation has been demonstrated for Penicillium expansum on apple (3). The saprophytic development which has been found (10) to precede invasion of normal tissue by Rhizopus would be supplied from the previously infected fruit.

From a lot picked August 15 and graded to remove No. 1 and No. 2 green fruit the next day, two lug boxes of tomatoes without injury but which had been in contact with decayed fruit were selected on August 18. After 5 hours these selected fruits showed 3 percent decay, after 48 hours 10 percent, and after 72 hours 11 percent. Since the fungus was not allowed to spread from fruit to fruit, and infected tomatoes were removed before they "leaked," the 11 percent decay represented infections that occurred in the packing house. None of these originated at detectable injuries. A similar situation has been reported for peaches (2).

Limited tests were made to determine conditions under which Rhizopus infection could occur. No. 1 and No. 2 green tomatoes were taken directly from the field for this purpose. After being treated in the various indicated ways, some were placed on a laboratory table to provide aeration and drying and some were held in moist chambers. Spores were blown from the fungus mats on rotted fruits onto those tomatoes which are tabulated as "dusted with spores". Four days later the num-

ber with Rhizopus decay was noted (Table 1).

Table 1. Infection of green-wrap tomato fruit by Rhizopus spores in relation to wounds after 4 days. Fruit rinsed in sodium hypochlorite (0.4 percent available chlorine) prior to its use, except as noted. 1944.

| Inoculation method | Fruit in test | Number of fruit punctured[a] | | Number of fruit unpunctured | |
|---|---|---|---|---|---|
| | | Table | Moist chamber | Table | Moist chamber |
| Uninoculated | Total | 10 | 2 | 6 | 2 |
| | Infected | 1 | 0 | 0 | 0 |
| Dusted with spores immediately | Total | 19 | 2 | 6 | 2 |
| | Infected | 19 | 2 | 0 | 0 |
| Dusted with spores after wounds dried 2 hours | Total | 9 | 2 | 6 | 2 |
| | Infected | 9 | 2 | 0 | 0 |
| Dusted with spores after wounds dried 4 hours | Total | 11 | 2 | 6 | 2 |
| | Infected | 9 | 1 | 0 | 0 |
| Uninoculated[b] | Total | 5 | 2 | - | - |
| | Infected | 0 | 1 | - | - |
| Uninoculated; not treated with hypochlorite[b] | Total | 21 | 2 | - | - |
| | Infected | 3 | 1 | - | - |
| Abraded on infested dirty box | Total | 30 | 2 | - | - |
| | Infected | 21 | 2 | - | - |
| Abraded on same box after it was sterilized at 300°F for 1 hour | Total | 24 | 2 | - | - |
| | Infected | 3 | 1 | - | - |

[a]Punctured with sterile stick.

[b]Fruit repeatedly slashed with sterile scalpel to demonstrate presence of any viable spores on fruit. Undecayed fruit on table badly shriveled from injuries.

The punctured, uninoculated series untreated with hyopchlorite indicated that the fruit was not heavily infested by Rhizopus at the time it was gathered in the field. Air-borne spores infected tomatoes only through injuries, perhaps best when these were fresh, but even through those dried for 4 hours. Fruit abraded on an infested dirty box had 70 percent decay; the agitation was admittedly greater than in normal handling. There was a suggestion that a sodium hypochlorite rinse of the fruit somewhat reduced the spore infestation.

Treatment of Picking Boxes and Cardboard Liners--Because the contaminated boxes seemed to have initiated this epiphytotic, means of sterilizing them were considered. For use in these tests pieces about an inch square were cut from corrugated cardboard pads which had been in use in 1944 and had evident fungus mats.

Twenty such pieces were dipped in sodium hypochlorite and agitated so as to wet them thoroughly. Each piece was then placed in a sterile petri dish and covered with cooled agar. From all of these the fungus quickly and copiously developed. Ten similar pieces sprayed with the hypochlorite also developed the fungus. Because of the manual difficulties of treating the 20,000 lug boxes by such means, this approach was abandoned and the recommended treatments with boiling water (9) or washing soda solution (1) were not tried. Since the building was not tightly constructed, the chloropicrin (7,13) or formaldehyde (7; 11, pp. 105-106) fumigation methods could not be tested.

Because there was a nearby commercial tunnel dehydrator which could be used for heat treatment of the boxes, the thermal tolerance of the fungus was studied. The dehydrator was able to reach 200-220°F and would hold several thousand boxes at each load.

Pieces of the infested cardboard were placed in sterile petri dishes and held in an electric oven at the temperature and time intervals indicated. They were then cooled and the specimens covered with cool agar. After several days data were taken showing survival of the fungus (Table 2).

To eradicate the fungus on the picking boxes, it would appear to be necessary to use dry heat of 300°F for 1 hour or to heat the freshly wetted boxes to 200°F for 2 hours. The spore load was drastically reduced, however, by dry heat of 250°F for 1 hour. Squares cut from one-year-old cardboards (used in 1943) yielded abundant Rhizopus after dry heat treatment at 200°F for 2 hours. It seems improbable, therefore, that year-old spores are much less tolerant of heat than young ones. Thom and Ayers (17) found that dry heat of 250°F for 30 minutes was required to kill sporangiospores of this fungus, and Fish (8) recommended dry air of 210°F with sulfur, for 40 minutes. Since steam of 212°F kills the spores in 5 minutes (15), a steam chamber perhaps modified from that described by Whittaker (18) would be desirable for commercial treatment of lug boxes during the season.

Before any successful commercial treatment could be undertaken, a period of hot weather in early September so accelerated fruit ripening that green-wrap shipments from the establishment ceased. For the 1945 season new boxes and corrugated pads were again available. The packing house was thoroughly cleaned following the 1944 season and sprayed with a sodium hypochlorite solution. No complaints on any cars were received in 1945.

Summary. An epiphytotic of Rhizopus soft rot occurred in green-wrap and pink-ripe tomatoes from a California packing house in 1944. It was found to have started from old, badly infested picking boxes and cardboard pads in which fruit had been allowed to decay at the end of the 1943 season.

Owing to war deficiencies of box shook and pads it was necessary to use these containers again in 1944. This primary inoculum was in-

creased rapidly by the packing house practice of holding subgrade fruit in the same building to ripen for market instead of prompt disposal. Much decay and sporulation resulted, adding to the contamination of the shed.

Rhizopus was found to require wounds for infection by air-borne spores, and these wounds could have dried for at least 4 hours prior to inoculation. Wounds apparently are not required for mycelial spread from an adjacent decayed fruit.

To eradicate the fungus from boxes and cardboard pads it was necessary to use dry heat of 300°F for 1 hour or to heat freshly wetted boxes to 200°F for 2 hours. The use of dry air at 250°F for 1 hour reduced populations of the fungus, but lower temperatures were ineffective even after 3 hours.

Table 2. Effectiveness of various heat treatments in killing Rhizopus spores on pieces of naturally infested cardboard pads.

| Temperature °F | Test conditions | Test squares | Treatment time (hours) 1 | 1 1/2 | 2 | 3 |
|---|---|---|---|---|---|---|
| 300 | Test squares dry | Total | 15 | - | - | - |
| | | With viable spores | 0 | - | - | - |
| 250 | Test squares dry | Total | 15 | - | - | - |
| | | With viable spores | 7[a] | - | - | - |
| 220 | Test squares dry[b] | Total | - | 5 | 5 | 5 |
| | | With viable spores | - | 5 | 5 | 5 |
| 200 | Test squares dry[b] | Total | 15 | 5 | 5 | 5 |
| | | With viable spores | 15 | 5 | 5 | 5 |
| 200 | Test squares dipped in water and heated immediately | Total | - | - | 10 | 10 |
| | | With viable spores | - | - | 0 | 1[c] |
| 200 | Test squares dipped in water, dried 2 hours before heating | Total | - | - | 10 | 10 |
| | | With viable spores | - | - | 5 | 4 |
| 150 | Test squares dry[b] | Total | 15 | - | - | - |
| | | With viable spores | 15 | - | -- | - |
| Check | Test squares dry | Total | 15 | - | - | - |
| | | With viable spores | 15 | - | - | - |

[a] Colonies starting tardily from the few surviving spores.
[b] Many spores survived on each square; indistinguishable from check.
[c] Single colony was a contamination.

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DIVISION OF PLANT PATHOLOGY
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## THREE HITHERTO UNREPORTED DISEASES OF CORN IN PENNSYLVANIA

C. C. Wernham

In July 1943, a research program in Hybrid corn was instituted at this station. In the course of the investigations three diseases of corn new to Pennsylvania have been reported. Two of these are leaf blights.

1. Helminthosporium carbonum Ullstrup, Race II, was collected at the Farm Bureau nursery at Tatamy, Northampton County, Pennsylvania in September 1944. Species identification was made by Dr. L. O. Overholts and A. J. Ullstrup. Race identification was made in the greenhouse by using the differential lines and hybrids described by Ullstrup and by inoculation with Pennsylvania isolates and with authentic cultures of Races I and II obtained from him.

2. Helminthosporium maydis Nisik. & Miyake (Cochliobolus heterostrophus Drechs.) was collected at Lancaster in September of 1944 but was not differentiated from H. carbonum until inoculations were made in June of 1945. During the 1945 season H. maydis was the most serious leaf blight in southeastern Pennsylvania and southern areas of New Jersey. Collections were made as far north as Selingsgrove, Snyder County, Pennsylvania, where the damage on some double crosses exceeded that of H. turcicum, although neither was severe. At Avondale, Chester County, Pennsylvania H. maydis reached epiphytotic proportions.

Artificial inoculation of inbred lines at State College using techniques developed by Elliott and Jenkins (Phytopath. 35: 485, 1945) and by the writer reveals some interesting data relative to resistance to H. maydis. The ratings of inbred lines given below were made with reference to the chart recommended for H. turcicum in the "Report of the Committee on Methods for Reporting Corn Disease Ratings" (Charlotte Elliott, P. E. Hoppe, A. J. Ullstrup, Chairman), Division of Cereal Crops and Diseases, U.S.D.A.

Those readers who are unfamiliar with the above-mentioned chart will be able to appraise the ratings if it is pointed out that the ratings - 0.5; 1.0; 2.0; 3.0; 4.0; 5.0 - are in order of increasing susceptibility. Any rating of 2.0 or less would be acceptable as satisfactory.

One of the interesting features of this test is the fact that Ind 461-3 and Ind Tr, inbred lines which are very susceptible to Helminthosporium turcicum, show pronounced resistance to H. maydis.

| Method of Elliott and Jenkins, inoculated ten times | | Method of Wernham inoculated once | |
|---|---|---|---|
| Inbred line | Rating | Inbred line | Rating |
| NC 34 | 3.0 | I 11 90 | 2.5 |
| CI 23 | 4.0 | Conn 782,130 | 2.5 |
| K 175 | 3.0 | NJ A 30 | 0.5 |
| Ky 114 | 4.0 | NJ A 36 | 2.0 |
| CI 15 | 2.0 | NJ A 164 | 1.5 |
| Mo 21A | 3.0 | NJ A 191 | 2.5 |
| T 49B | 4.75 | NJ A 195 | 2.0 |
| T 105B | 5.0 | US 4-8 | 2.5 |
| K 155 | 4.0 | Ia L 289 | 4.0 |
| CI 19 | 3.0 | Ia I 205 | 2.5 |
| Tx 206 | 3.5 | Mo K | 2.5 |
| Tx 155A | 4.0 | I 11 Hy | 3.0 |
| T 61 | 4.0 | I 11 $R_4$ | 2.0 |
| J7-6A | 1.0 | Ind Tr | 0.5 |
| K 201 | 3.0 | Ia 4317 | 3.0 |
| Mo 22 | 3.25 | Ia 1 198 | 3.0 |
| CI 43 | 4.0 | Conn 1-7 | 4.0 |
| L 317 | 4.0 | Neb N6 | 3.5 |
| CI 63 | 4.25 | I 11 P8 | 3.0 |
| T 85 | 4.0 | Kys | 4.0* |
| Ky 27 | 2.0 | Ia Os 426 | 0.5-1.0 |
| Mo 940 | 5.0 | Ind 38-11 | 2.0 |
| J6-2E | 4.0 | Ia I 233 | 2.0 |
| Oh 56 | 4.0 | NJ A 224 | 2.0 |
| Ind 461-3 | 0.5 | Oh 07 | 3.0 |
| | | Mo 21A | 2.0 |
| | | K 44 | 2.5 |
| | | Ind Prl | 4.0 |
| | | US 187-2 | 2.0 |

*Distribution called for 4.0 rating. Actually the severity rated 2.0

Note: L 317 and Mo 21A have ratings 1 classification lower when inoculated only once.

3. Crazy-Top. Crazy-Top was first collected in a small field of Ohio M 15 at State College in 1944. In 1945 it was a minor disease in one of our nurseries. Only certain lines seemed to be affected, I 11 Hy., Mo 940, Minn C 11. The symptoms were typical of those described by Koehler (Phytopath 29: 817-820, 1939). Except in one plant of Mo 940, there was complete proliferation of tassels and ears. This exceptional plant was only partly proliferated in the tassel, the main spike producing normal pollen. Crosses were made on normal plants of I 11 Hy and a satisfactory seed set was produced.

In line I 11 Hy all the plants were of normal height. In Mo 940 severe stunting due to shortening of the internodes was evident. The mature Crazy-top plant was barely 2 feet high. Inbred line US 4-8 planted next to Minn C 11, showed striking mosaic-like symptoms with

severe stunting and marked necrosis of the lower leaves. However, since neither tassels nor ears were produced it was impossible to say that these symptoms were associated with Crazy-top.

DEPARTMENT OF BOTANY
THE PENNSYLVANIA STATE COLLEGE

## BACTERIAL DISEASES OF PLANTS IN CALIFORNIA IN 1945

P. A. Ark and C. M. Tompkins

Fire-blight (Erwinia amylovora) of pears was serious in some sections where considerable rain fell during blossoming time. Walnut blight (Phytomonas [Xanthomonas] juglandis) was light because of a dry spring and summer. However, in Sonoma County, where the rain-fall was normal, walnut blight was severe. Bacterial gummosis (Phytomonas [Pseudomonas] syringae) seriously affected many young stone-fruit trees during the summer. In many cases the disease seemed to have originated on cut surfaces. Crowngall (Phytomonas [Agrobacterium] tumefaciens) of stone-fruit trees in the nurseries varied from a moderate to heavy amount on land in continuous use for nursery stocks. Sulphuring of the soil before planting seeds was effective in reducing the incidence of the disease.

Root infection of carrot bacterial spot (Phytomonas [Xanthomonas] carotae) has been prevalent in the carrot-growing area in Salinas Valley.

Begonia leaf spot (Phytomonas [Xanthomonas] begoniae), serious on begonias in past years, has become very rare since overhead watering has largely been eliminated. Black rot of stocks (Phytomonas incanae) caused much damage where seed had not been treated by hot water before planting. In a 1/4-acre plot the incidence of disease was one hundred percent. Erwinia carotovora also caused considerable damage in a commercial planting of yellow callas (Zantedeschia elliottiana), destroying both foliage and flowers. Chalk rot (a combination of Phytomonas [Erwinia] aroideae and Erwinia carotovora) of yellow and pink calla corms, was serious in many fields, especially where heavy irrigation was given over a period of several months. Stem rot (Erwinia phytophthora) of larkspur caused damage in several small plantings intended for cut flowers. One field of delphinium showed about 50 percent infection. Brown spot (Phytomonas cypripedii) of orchids has been prevalent in several commercial greenhouses on Cattleya sp. and Phalaenopsis sp. Bacterial leaf spot of gardenia (to be described soon) was serious in one commercial greenhouse. It produced heavy defoliation and noticeably affected the crop. Numerous lesions were found on flower buds. Bacteriosis of bird's-nest fern, Asplenium nidus, L., (to be published soon), which at first rots the leaves and later kills the plant, caused loss in a commercial greenhouse estimated at $10,000. Dieffenbachia leaf spot (Phytomonas dieffenbachiae) was especially severe on Dieffenbachia picta. Many potted plants were made unsalable because of damage to the leaves. Fasciation (Phytomonas [Corynebacterium] fascians) of nasturtium grown for seed appeared in epidemic form where seeds had not been subjected to hot water treatment as

recommended by K. F. Baker. The same organism also seriously affected sweetpeas and Esther Reed daisy plants.

DIVISION OF PLANT PATHOLOGY
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## DISEASES OF VEGETABLE CROPS DURING NOVEMBER IN PALM BEACH COUNTY, FLORIDA

G. R. Townsend, R. C. Cassell, and E. L. Felix

BEANS.... On the sandy soils of the coastal area root rot (Rhizoctonia sp.) has continued to be of major importance both in bush snap beans and limas. Root rot was the cause of unsatisfactory growth in each of three fields where growers requested investigation. In these fields infection was 100 percent, and the plants generally were restricted in growth and some were dead or dying. The Rhizoctonia fungus caused considerable soil rot of the tips of pods touching the soil in Everglades fields following rains in mid-November. This disease affected the marketing of beans adversely because buyers were afraid beans from affected fields would nest during transportation to market. The new Florida Belle bean won additional favor with growers and buyers because it carries its crop high on the plant and was free of soil rot.

Other diseases seen affecting beans were mosaic (virus) on about 3 percent of the beans in one field near Boca Raton, and southern blight (Sclerotium rolfsii) affecting 0.5 percent of the plants in a two-acre field in the same area.

CABBAGE Black rot (Phytomonas [Xanthomonas] campestris) has been unusually prevalent this fall. In a number of instances it seems to have occurred in fields that had been affected by heavy rains. One grower reported infection to the extent of 75 percent in one stock of cabbage, but very little in another.

Downy mildew (Peronospora parasitica) was first observed on November 21, at which time it was prevalent and destructive to seedling cabbage and broccoli, but was not affecting cauliflower in the same seed bed.

CUCUMBER A ten-acre field examined on November 6, showed a trace of mosaic (virus) and 1 to 2 percent of the plants were affected with downy mildew (Pseudoperonospora cubensis). A small plot of cucumbers in the Everglades was so injured by three applications of DDT (3/4 pound DDT per 100 gal.) that the plants were of no value. Yellow blotches similar to downy mildew appeared on the leaves. Very few pistillate flowers developed on these plants and none bore fruits.

CELERY Early blight (Cercospora apii) has been very prevalent in celery fields of all ages. In one of the first fields to reach maturity, it was estimated to be causing a 25 percent loss, but losses are negligible in well-sprayed fields.

Mosaic (virus) was present in some of the celery fields, and in the two fields most seriously affected was present to the extent of 11 and

25 percent of the plants.

Pencil-stripe (physiogenic) has occurred in two fields to a moderate extent. This disease, which is characterized by rusty-brown stippling along the vascular strands on the petioles, has been designated "rust" by produce inspectors. It is diagnosed as due to boron deficiency by some. In the opinion of the writers it is not characteristic of boron deficiency.

ESCAROLLE A bacterial leaf spot resulting in a watery soft black rot of this crop was observed early in November.

EGGPLANT Most plantings are slightly affected with Phomopsis vexans.

PEPPER A large field of peppers in the Everglades which was 75 percent defoliated by bacterial leaf spot (Xanthomonas vesicatoria) in October, showed renewed growth in November and is now producing a small yield with occasional fruit-spotting. Mosaic (virus) was found to the extent of a trace to 5 percent of the plants in fields in the coastal and Everglades area. Frog-eye leaf spot (Cercospora capsici) was present in one field.

POTATOES Early blight (Alternaria solani) appeared on the older plantings late in November. Potatoes which had been planted prior to the September hurricane seemed to be considerably weakened and more susceptible to this disease. Well sprayed fields remained nearly free of this disease, but control was poor in fields dusted by airplane.

Late blight (Phytophthora infestans) appeared November 28 and had been found in three plantings by the end of the month. At this date it was not important but was increasing.

A small percentage of the plants in all Everglades fields were affected by Rhizoctonia, which caused stems to rot after the crop was hilled.

SQUASH Mosaic (virus) is quite prevalent in the Everglades area but not in the coastal area. Fields near Lake Okeechobee showed from 14 to 75 percent of the plants affected.

TOMATOES Fields lightly affected with early blight (Alternaria solani) and mosaic (virus) have been observed.

EVERGLADES EXPERIMENT STATION, December 1, 1945

## √ BRIEF NOTES ON PLANT DISEASES

PHYTOPHTHORA ROT OF PEARS UNDER SPRINKLER IRRIGATION AT HOOD RIVER, OREGON: An interest in sprinkler irrigation has developed at Hood River during the past three years, so that the conventional rill system of irrigation has now been replaced by sprinkler in about 20 orchards. Since Harley and Reeves[1] had already reported that several apple and

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1 Harley, C. P., and E. L. Reeves. Observations of apple and pear diseases under overhead irrigation. Proc. Wash. State Hort. Assn. 26: 48-50, 1930.

pear diseases made their appearance, or were aggravated, as a result of the use of overhead irrigation in Washington, it was anticipated that some trouble might develop at Hood River.

During the first week of August a few Bartlett and Anjou pears that appeared to be sunburned were noticed in a sprinkled orchard. The damaged pears occurred as commonly, however, on the north side of trees as on the exposed southern side, and were largely present on the lower limbs where sprinkler water had reached. Cultures made from the diseased tissue, and pears kept in moist chambers over night, all yielded pure growth of a fungus agreeing in all respects with Phytophthora cactorum[2]. It is an interesting corroboration that this fungus, which is rarely encountered on fruit except in storage, was found to cause a fruit rot on the trees in Hood River Valley, as well as in the Wenatchee, Washington, district, as soon as sprinkler irrigation was practiced.--J. R. Kienholz, Associate Pathologist, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture.

BLACKLEG ON RUTABAGA IN MINNESOTA AND ITS CONTROL: Blackleg (Phoma lingam) was first found on rutabaga in Minnesota by Dr. J. G. Leach about 1930 and he made the identification at that time. Since then the disease has become quite serious in our rutabaga region. I saw two fields this year that had losses of 100%, and one with 80% loss from this disease. Our results with hot water seed treatment and crop rotation indicate very good control on other fields.--R. C. Rose, Extension Pathologist, University Farm, St. Paul, Minnesota. Dec. 17.

[NOTE: Blackleg apparently is not common on rutabaga in this country. The Survey has records of occurrence on this host from Georgia (1928) and Massachusetts (1931). Clinton (Connecticut Agricultural Experiment Station Bull. 358, p. 263, Feb. 1934) reported root rot in storage due to Phoma napobrassicae, usually considered a synonym of P. lingam.]

POWDERY MILDEW ON TOBACCO (NICOTIANA TABACUM): Powdery mildew is a common disease of tobacco in Africa, Europe, Asia, and the tobacco-growing islands of the Pacific. It has been reported from Brazil and Guatemala on tobacco but not, to my knowledge, from North America except on Nicotiana affinis (PDR 29: 693, 1945).

The past fall (1945) we have had several species of Nicotiana growing in the greenhouse, including N. alata. This species developed powdery mildew in the early fall, and it has persisted on this species up to the present time, gradually killing the leaves. During the last few days powdery mildew has developed on burley tobacco plants growing in thumb pots.

It seems probable that the powdery mildew on N. alata is a species from some local weed or cultivated plant that is unable to parasitize tobacco during the summer or early fall. However, when the fungus is carried on N. alata into the winter, in the greenhouse, it then finds N. tabacum in a physiological condition that renders it susceptible to the fungus, and powdery mildew results. Perithecia have not been

[2]Rose, Dean H., and Carl C. Lindegren. Phytophthora rot of pears and apples. Jour. Agr. Research 30: 463-468, 1925.

found either on N. alata or on N. tabacum.-- W. D. Valleau, Kentucky Agricultural Experiment Station. Dec. 10.

SOFT ROT OF LEAVES AND FLOWERS OF YELLOW CALLA (ZANTEDESCHIA ELLIOTTIANA) CAUSED BY ERWINIA CAROTOVORA: Although Erwinia carotovora is known to cause some damage of calla corms in combination with Phytomonas [E.] aroideae, a disease of above-ground parts has not to our knowledge previously been recorded in the literature. A serious decay of leaves and flower stalks of yellow calla (Zantedeschia elliottiana) was observed during the last two years in a commercial planting in central California. The disease was severe during cool humid summer days, commencing as isolated spots on unfolding leaves or petioles, rapidly progressing downward toward the base of the plant and changing the leaves into a soft wet mass. Sometimes several yellow spots on a leaf blade initiated rapid decay, forming water-soaked areas which caused prompt collapse of the leaf. Flower stalks were also infected at the time of emergence from the soil and were either disfigured or completely destroyed. Although the disease progressed downward it did not affect the corm. Drying of the soil was highly effective in checking the progress of the disease. Bacteriological studies of the causal organism yielded a bacterium which proved to be identical with Erwinia carotovora. Inoculation of carrot roots and potato tubers (inoculated with the isolate) promptly produced typical soft rot. Detached but living yellow and pink calla leaves sprayed with a bacterial suspension of the isolate were completely decayed after incubation at 23°C in a moist chamber. White calla (Z. aethiopica) leaves when sprayed or injected with the soft rot organism failed to become infected, indicating they may be resistant to the Erwinia carotovora from yellow callas.--P. A. Ark and C. M. Tompkins, Division of Plant Pathology, University of California, Berkeley 4, California.

NEW LOCATIONS AND NEW HOST RECORDS FOR OAK WILT IN MISSOURI: Oak Wilt (Chalara quercina) was discovered in Missouri in 1944. [PDR 28: 951. Oct. 1, 1944] Since that time we have had the opportunity to do some scouting work and found it rather generally scattered in the vicinity of St. Louis. One other location was spotted near Mexico, Missouri. The infected material was collected and sent to Dr. C. S. Moses, Pathologist, located at the Forest Products Laboratory in Wisconsin. Doctor Moses suggested that we report that post oak (Quercus stellata) produced a culture of the oak wilt fungus. Shingle oak (Quercus imbricaria) also produced Chalara quercina in all plates. According to Doctor Moses these were new host records. The material from these infected trees was collected by Ivan Rainwater and myself. --J. A. Denning, State Entomologist. Missouri State Department of Agriculture, Jefferson City. Dec. 13.

## DECEMBER WEATHER

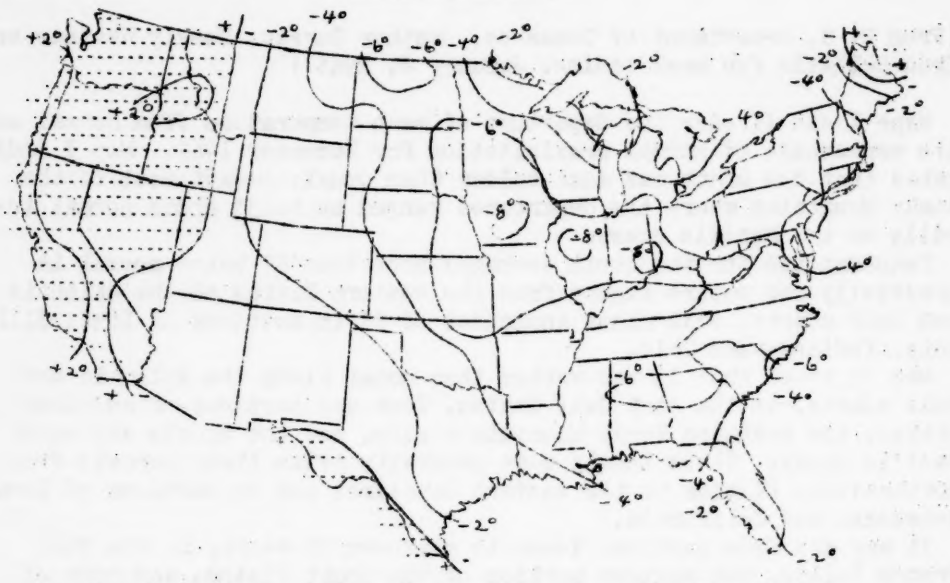
(From U. S. Department of Commerce, Weather Bureau, Weekly Weather and Crop Bulletin for week ending, January 8, 1945.)

Maps I and II show the departure of mean temperature from normal and the percentage of normal precipitation for December 1945. Map I indicates that the month was much colder than usual, except west of the Rocky Mountains where the departures ranged up to 3° above normal locally on the Pacific coast.

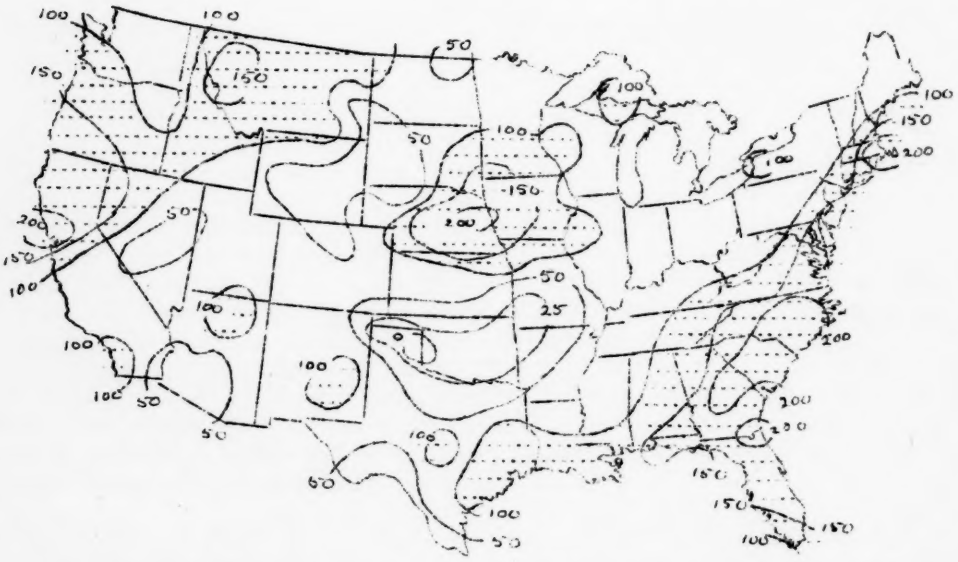
Temperatures for the month averaged more than 4° below normal in practially the entire region from the western Plains to the Atlantic and Gulf coasts, with minus anomalies of 8° in sections of Iowa, Illinois, Indiana, and Ohio.

Map II shows that it was wetter than usual along the Atlantic and Gulf coasts, in the east Gulf States, Iowa and portions of adjoining states, the northern Rocky Mountain region, and the middle and north Pacific areas. These totals were generally twice their normals from northeastern Florida to the eastern Carolinas and in sections of Iowa, Nebraska, and California.

It was dry from northern Texas to southern Missouri, in the Rio Grande Valley, the western portion of the Great Plains, and most of the far Southwest, with many stations in these areas receiving less than one-fourth of their usual December precipitation.




Map I. Departure of Mean Temperature from the Normal for December 1945




Map II. Percentage of Normal Precipitation for December 1945